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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,418	05/13/2005	Edouard S.P. Bouvier	60009US(49991)	4955

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EXAMINER

ARNOLD, ERNST V

ART UNIT

PAPER NUMBER

1616

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/516,418

**Applicant(s)**

BOUVIER ET AL.

**Examiner**

ERNST V. ARNOLD

**Art Unit**

1616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3-5, 7-9, 11, 13-33, 65, 113, 117 and 123 is/are pending in the application.
- 4a) Of the above claim(s) 31, 32, 65, 113 and 117 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-5, 7-9, 11, 13-30, 33 and 123 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-846)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 3/5/08
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/10/08 has been entered. The restriction requirement of 9/5/06 remains in force.

Claims 2, 6, 10, 12, 34-64, 66-112, 114-116 and 118-122 have been cancelled. Claims 31, 32, 65, 113 and 117 have been withdrawn. Claims 1, 3-5, 7-9, 11, 13-30, 33 and 123 are under examination.

**Withdrawn rejections:**

Applicant's amendments and arguments filed 4/10/08 are acknowledged and have been fully considered. Any rejection and/or objection not specifically addressed below is herein withdrawn.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

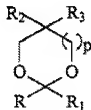
A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 7-9, 11, 20-30, 33 and 123 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (WO 00/70334).

Lee et al. disclose in claim 27:

27. A method of solubilizing a substance comprising contacting a substance with a surfactant represented by the formula (Formula I):



in which

p is 0, 1 or 2;

R is alkyl;

R<sub>1</sub> and R<sub>2</sub> are each, independently, hydrogen or methyl; and

R<sub>3</sub> is selected from -OSO<sub>3</sub><sup>-</sup>, -R<sub>4</sub>OSO<sub>3</sub><sup>-</sup>, -R<sub>4</sub>OR<sub>5</sub>SO<sub>3</sub><sup>-</sup>, and -OR<sub>5</sub>SO<sub>3</sub><sup>-</sup>,

wherein R<sub>4</sub> and R<sub>5</sub> are each, independently, lower alkyl.

It is the Examiner's position that "solubilizing a substance" reads on "enhancing a chemical reaction of a molecule" as recited in instant claim 1 and is a favorable chemical property with increased efficiency thus anticipating instant claims 20 and 21. Instant claim 25 is anticipated when  $R_2 = H$  and  $p = 0$ . Instant claim 26 is anticipated when  $p = 1$ ,  $R_2 = H$ ,  $R_3 = -OR_5SO_3^-$ ,  $R = \text{akyl}$  and  $R_1$  is methyl (Page 12, Scheme 1). Instant claim 27 is anticipated when  $p = 0$ ,  $R_1 = \text{methyl}$ ,  $R = \text{alkyl}$ ,  $R_2 = H$  and  $R_3 = -R_4OSO_3^-$  (Page 12, Scheme 1). Lee et al. disclose wherein the substance is an inclusion body, lipophilic protein or membrane-bound protein sample (Claims 28-31). Lee et al. teach a method where a proteolytic protein (lysozyme, trypsinogen, pepsin, for example) is contacted with ALS-I thus reading on instant claims 2, 6 and 7 (page 14, lines 5-15). The presence of a biomolecule in the aqueous surfactant solution makes it a biological sample and reads on instant claim 4. The aqueous surfactant solution has water, which is a biological fluid and reads on instant claim 5. Samples were heated to ensure protein denaturation and anticipates instant claim 22 (page 14, lines 14-15). Gels were run in the absence of SDS thus reading on instant claim 30 and 33 (page 14, lines 26-31). Lee et al. teach 50  $\mu\text{L}$  aliquots and thus perform under microscale conditions and reads on instant claim 29. Mass spectrometry was used for detection of myoglobin treated with ALS-I thus anticipating instant claims 3, 8 and 28 (page 15, lines 4-22). Lee et al. state that "mass spectrometric detection" refers to Matrix Assisted Laser Desorption Ionization MALDI which applicant states on page 21 lines 21-22 is surface desorption ionization analysis and reads on instant claim 9 (Page 6, lines 30-32). Gels run with ALS-I were stained with zinc-imidazole (page 14, lines 26-31). On one hand, the surfactant was degraded in glacial acetic acid for 16 prior to mixing with myoglobin and on the other hand trifluoroacetic acid was added to degrade the surfactant before electrospray

mass spectrometry of myoglobin and reads on claims 11, 23, 24 and 123 (page 15, lines 10-22; page 16, line 8 and page 18, lines 14-26).

**Response to arguments:**

Applicant asserts that the Examiner has taken out of context the definition of chemical alteration which has led to the misunderstanding regarding the scope of the claim. Applicant cites the passage that state: "In certain embodiments, the chemical alteration of a molecule produces a chemically or physically, e.g., solubilization, altered molecule." Applicant emphasize, "above all, that the chemical alteration, while possibly producing altered molecules that are soluble, must involve a chemical reaction at the very least." Applicant concludes by stating that a physical change, such as solubilization, may occur as a result of a chemical reaction or chemical alteration, but that solubilization on its own, is a physical change (and not a chemical change). The Examiner understands what Applicant is saying but cannot agree for the following reasons.

Applicant's argument is contradictory to what is disclosed in the specification. On page 8, lines 1-5 the language is:

**The language "chemical reaction" is intended to include a chemical transformation or change as the result of an interaction of chemical entities. In particular embodiments of the invention, the chemical reaction is chemical digestion or chemical alteration. The chemical reactions may involve and/or be associated with analysis, e.g., solubilizing, separating, purifying, detecting and/or characterizing the molecules. For**

This passage clearly states that a chemical reaction includes a chemical transformation or change as the result of an interaction of chemical entities and may involve solubilizing the molecules. So, for example, the surfactant interacts with the biomolecule resulting in enhanced

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solubilization of the biomolecule. Applicant's disclosure is clear: embodiments where solubilizing molecules by chemical reactions is disclosed. Thus, a contradiction is made. On the one hand Applicant argues that solubilization is a physical change and does not fall under the umbrella of chemical reaction (but may occur as a result of a chemical reaction) and on the other hand the specification teaches that solubilization is a chemical reaction resulting from the interaction of chemical entities. The Examiner can only conclude that solubilization does fall within the scope of the language "chemical alteration". The interpretation set forth is based upon Applicant's own teachings.

Respectfully, the Examiner has earnestly considered Applicant's arguments but cannot find them persuasive because Applicant's own specification teaches differently from that which has been argued and even Applicant admits that solubilization may occur as a result of a chemical reaction. The claims remain rejected.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

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3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 3-5, 7-9, 11-30, 33 and 123 remain/are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (WO 00/70334) in view of Zee-Yong et al. (Anal Chem. 2001, 73, 2558-2564) and Nelson (US 6,093,541).

Applicant claims a method for enhancing a chemical digestion, chemical alteration or a combination thereof of a biomolecule comprising contacting the molecule with a surfactant.

**Determination of the scope and content of the prior art**

**(MPEP 2141.01)**

The reference of Lee et al. is described in detail above and that discussion is hereby incorporated by reference.

Zee-Yong et al. teach identification of individual proteins (11 proteins were studied and include: rabbit phosphorylase, bovine serum albumin, chicken egg ovalbumin, rabbit aldolase, bovine carbonic anhydrase, horse myoglobin, bovine hemoglobin, horse cytochrome c, chicken egg lysozyme, and bovine ubiquitin (Page 2559 Experimental section).) in complex protein mixtures by MALDI mass spectrometry (Abstract). Thermal denaturation followed by in-solution trypsin digestion is used to achieve uniform digestion of the constituents of the protein mixture (Abstract and page 2559, experimental section).

Nelson teaches proteases for use in mass spectrometers (Abstract and column 7, lines 28-65 and claim 4). Nelson teaches chymotrypsin, Glu-C, Lys-C, S. aureus V8 protease, clostripain, and trypsin, for example, as enzyme proteases and chemical agents such as cyanogens bromide



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and hydroxylamine (column 7, lines 28-65). Nelson teaches immobilized proteases (Figures 3, 3A, 5 and 6; and column 16, example 10 for example). Nelson teaches adding reducing agents (column 7, lines 55-57).

#### **Ascertainment of the difference between the prior art and the claims**

##### **(MPEP 2141.02)**

1. Lee et al. do not expressly teach a method wherein the reaction comprises chemical digestion/chemical alteration and wherein the biomolecule is contacted with a protease; that is immobilized. This deficiency in Lee et al. is cured by the teachings of Nelson et al. and Zee-Yong et al.

2. Lee et al. do not expressly teach a method wherein the method further comprises separating the resulting biomolecule fragments. This deficiency in Lee et al. is cured by the teachings of Zee-Yong et al.

#### **Finding of prima facie obviousness**

##### **Rational and Motivation (MPEP 2142-2143)**

1. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to perform chemical digestion/chemical alteration or contact the biomolecule with a protease that is immobilized, as suggested by Zee-Yong et al. and Nelson, in the method of Lee et al. and produce the instant invention.

One of ordinary skill in the art would have been motivated to do this because Zee-Yong et al. and Nelson teach common reagents and techniques known to one of ordinary skill in the art used in the analysis of proteins using mass spectroscopy.

2. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to separate the biomolecule fragments after contacting the biomolecule with a protease, CNBr or hydroxylamine and produce the instant invention.

One of ordinary skill in the art would have been motivated to do this because after the chemical digestion, the fragments would be run on the mass spectrometer and separated for identification as generally taught by Nelson et al. and Zee-Yong et al.

A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill in the art might reasonably infer from the teachings. (*In re Opprecht* 12 USPQ 2d 1235, 1236 (Fed Cir. 1989); *In re Bode* 193 USPQ 12 (CCPA) 1976).

In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35 USC 103(a).

From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

**Response to arguments:**

Applicant reasserts that the chemical alteration must involve a chemical reaction. This argument has been addressed above by the Examiner in great detail.

Applicant asserts that the instant invention has unexpected results and advantages of using a surfactant to enhance a chemical digestion or alteration of a protein or peptide which include more rapid, reproducible, relatively low temperature digestion of a protein or peptide

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which requires less protease due to enhanced efficiency of the reaction resulting in more complete reactions and increased number of correctly cleaved fragments. While the Examiner appreciates the data obtained by Applicant, such as in Table 1 on page 25 and Table 2 on page 26, such advantages are intrinsic to use of the surfactant and Lee et al. use the same surfactants. Applicant has provided no side by side comparison to ascertain if such results are truly unexpected. Therefore, the Examiner can only conclude that Applicant's unexpected results are actually expected results with the use of the surfactant in the absence of evidence to the contrary.

Applicant's arguments are not persuasive and the rejection is maintained.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 3-5, 7, 22, 23, and 25-27 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 3, 5-7,

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16, 18 and 27 of copending Application No. 10/169,002 (Now US 7,229,539). Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant method of enhancing a chemical reaction of a molecule comprising contacting the molecule with a surfactant is encompassed by the patented claims drawn to a method for performing electrophoresis comprising contacting a sample with the same surfactant as instantly claimed as well as the method of solubilizing a substance comprising contacting the substance with the same surfactant as instantly claimed (patented claims 1 and 27). Patented claim 27 recites inclusion bodies, lipophilic proteins, receptors, membrane bound proteins and biological tissues which reads on instant claims 2, 4-7. Patented claim 18 is drawn to mass spectrometric detection. Patented claims 2 and 3 recite degrading the surfactant by contacting it with an acidic solution which reads on instant claims 23 and 24. The surfactants in patented claims 1, 5-7 and 27 read on instant surfactants in claims 1 and 25-27. One of ordinary skill in the art would have recognized the obvious variation between the instant invention and the copending application because the subject matter of the instant invention embraces or is embraced by the patented claims.

**Response to arguments:**

Applicant stated that the rejection would be addressed once allowable subject matter was indicated. Until that time, the claims remain rejected.

***Conclusion***

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ernst V. Arnold whose telephone number is 571-272-8509. The examiner can normally be reached on M-F (6:15 am-3:45 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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